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Preface

The Formal Foundations of Embedded Software and Component-Based Software Architectures (FESCA) 2007 workshop is a satellite event of ETAPS 2007, held in Braga, Portugal on the 24th of March 2007. It is the fourth FESCA in a line of successful workshops. This year the workshop is honoured to have as guest speaker Prof. Martin Wirsing from the Ludwig-Maximilians-Universität München.

The aim of the workshop is to bring together researchers from academia and industry interested in formal modeling approaches as well as associated analysis and reasoning techniques with practical benefits for embedded software and component-based software engineering.

Component-based software design has received considerable attention in industry and academia since object-oriented software development approaches became popular. Recent years has seen the emergence of formal and informal techniques and technologies for the specification and implementation of component-based software architectures. With the growing need for safety-critical embedded software and the increased relevance of reliability and scalability for enterprise software, this trend has been amplified.

Formal methods have sometimes not kept up with the increasing complexity of software. For instance, a range of new middleware platforms have been developed in both enterprise and embedded systems industries. Often, engineers use semi-formal notations such as UML2 to model and organize components into architectures. FESCA aims to address the open question of how formal methods can be applied effectively to these new contexts and challenges. FESCA therefore is interested in formal methods known from the area of embedded software development and software engineering and tries to cross-fertilize their research and application. Workshop topics

An underlying theme of formal methods research is to establish correctness or correct by construction. It is widely believed that formal methods are a good means to achieve correctness in complex software systems. However, advances in formal methods and formal verification have not kept up with the increasing complexity of software. We solicit papers that address this open problem.

One strength of FESCA is the link established between the embedded software

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design community and the formal software engineering community by exploring how formal approaches developed within one community affect or can be exploited by the other. Previous FESCA workshops achieved this by looking at new computing paradigms like ubiquity, component-orientation and novel middleware technologies, which are of shared interest for both, embedded software design and formal software engineering.

FESCA 2007 emphasizes particular focus on the following emerging areas of shared interest:

- Dependability: Due to safety-requirements common for many embedded systems, dependability research is often concerned with embedded software controling technical systems. However, the demonstration of the dependability of a system is of increasing relevance also for enterprise software, as increasingly mission-critical enterprise systems and e-Commerce rely on software support.
- Quality attributes and resource consumption: in both domains, embedded and enterprise software, quality attributes gain an increasing interest. While current software development processes, as used in industry, are mainly driven by the correct implementation of functional requirements, the systematic evaluation and prediction of quality attributes such as reliability, availability, resource consumption, performance and scalability is a matter of research. We consider formalisms used in one of the domains of embedded or enterprise software to be useful for the other. Given the complexity of today's concurrent, distributed and networked software, it is extremely important to provide formal techniques and CASE tools for analysis and reasoning on local component properties as well as on global system properties.

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